

**What is claimed is:**

1           1. A method for use in packet communication, comprising the steps of:  
2           encapsulating contents of a first Ethernet packet received at a port of a switch of a  
3           metropolitan area Ethernet network in at least one encapsulating Ethernet packet that is to  
4           traverse said metropolitan area Ethernet network; and  
5           assigning the source address of said at least one encapsulating Ethernet packet to  
6           be the address of said port at which said packet was received.

1           2. The invention as defined in claim 1 wherein said contents of said first Ethernet  
2           packet is the entirety of said first Ethernet packet.

1           3. The invention as defined in claim 1 wherein said contents of said first Ethernet  
2           packet is a portion of said first Ethernet packet.

1           4. The invention as defined in claim 1 wherein said encapsulating and assigning  
2           steps are performed in an Ethernet switch of said metropolitan area Ethernet network at  
3           an interface between said metropolitan area Ethernet network and another Ethernet  
4           network.

1           5. The invention as defined in claim 1 wherein said encapsulating and assigning  
2           steps are performed in an Ethernet switch of said metropolitan area Ethernet network at  
3           an interface between said metropolitan area Ethernet network, which serves a plurality of  
4           entities, and another Ethernet network, which serves only a single one of said entities.

1           6. The invention as defined in claim 1 further including the step of incorporating  
2           in said at least one encapsulating Ethernet packet an entity identifier which is a function  
3           of said address of said port at which said packet was received.

1           7. The invention as defined in claim 6 wherein said entity identifier is a virtual  
2           local area network (VLAN) tag.

1           8. The invention as defined in claim 1 wherein said encapsulating step is  
2 performed so that a first portion of said first Ethernet packet is encapsulated in said at  
3 least one encapsulating Ethernet packet and a second portion of said first Ethernet packet  
4 is encapsulated in at least a second encapsulating Ethernet packet that is to traverse said  
5 metropolitan area Ethernet network, the method further including the step of:  
6           assigning the source address of said second encapsulating Ethernet packet to be  
7 the address of said port at which said packet was received.

1           9. The invention as defined in claim 1 further including the step of:  
2           assigning said at least one encapsulating packet a destination address as a function  
3 of a stored association between the destination address of said first Ethernet packet and a  
4 destination address for said metropolitan area Ethernet network of a previously received  
5 Ethernet packet from said metropolitan area Ethernet network.

1           10. The invention as defined in claim 1 further including the step of:  
2           assigning said at least one encapsulating packet a destination address as a function  
3 of a stored association between the destination address of said first Ethernet packet and a  
4 port of said metropolitan area Ethernet network.

1           11. The invention as defined in claim 1 further including the step of:  
2           assigning said at least one encapsulating packet as at least one type from a set of  
3 types consisting of a broadcast packet and a multicast packet.

1           12. The invention as defined in claim 11 wherein said step of assigning said at  
2 least one encapsulating packet as a broadcast packet is performed when said first packet  
3 is a broadcast or a multicast packet.

1           13. The invention as defined in claim 11 wherein said step of assigning said at  
2 least one encapsulating packet as a broadcast packet is performed when there is no stored  
3 association between the destination address of said first Ethernet packet and a destination  
4 address for said metropolitan area Ethernet network of a previously received packet from  
5 said metropolitan area Ethernet network.

1           14. The invention as defined in claim 1 wherein said metropolitan area Ethernet  
2 network supports virtual local area network (VLAN) tags, and wherein said first Ethernet  
3 packet is a broadcast or multicast packet, the method further comprising the step of:

4           incorporating an entity identifier which is a function of said address of said port at  
5 which said first Ethernet packet was received as a VLAN tag in said encapsulating  
6 packet; and

7           assigning said at least one encapsulating packet as a broadcast packet.

1           15. An edge switch for use in a metropolitan area Ethernet network having ports  
2 adapted to be coupled to at least one local area Ethernet network, said edge switch  
3 comprising:

4           at least one port for receiving inner Ethernet packets from at least one of said local  
5 area Ethernet networks and for transmitting inner Ethernet packets to said at least one of  
6 said local area Ethernet networks, said at least one port being one of said ports of said  
7 metropolitan area Ethernet network; and

8           a memory for establishing a correspondence association between addresses within  
9 said at least one local area Ethernet network and addresses of said ports in said  
10 metropolitan area Ethernet network.

1           16. The invention as defined in claim 15 wherein given an address of a particular  
2 one of said addresses within said at least one local area Ethernet network said switch is  
3 operable to retrieve said corresponding associated one of said addresses of said ports in  
4 said metropolitan area Ethernet network.

1           17. The invention as defined in claim 15 wherein said memory further associates  
2 a time stamp with each said associated address within said at least one local area Ethernet  
3 network and address of said ports in said metropolitan area Ethernet network.

1           18. The invention as defined in claim 15 further comprising a virtual local area  
2 network (VLAN) tag marker.

1           19. The invention as defined in claim 15 further comprising a memory  
2 associating said at least one port of said metropolitan area Ethernet with an entity.

1           20. The invention as defined in claim 15 further comprising a packet stripper that  
2 extracts said inner Ethernet packets from encapsulating packets for transmission to said  
3 local area Ethernet via said port.

1           21. The invention as defined in claim 15 further comprising:  
2 a packet stripper that extracts at least a respective portion of a one of said inner  
3 packets from at least two different encapsulating packets; and  
4 an inner packet reassembler that receives said portions of said inner packet from  
5 said packet stripper and reconstructs therefrom said one of said inner packets.

1           22. The invention as defined in claim 15 further comprising:  
2 a memory writer for forming an association in said memory between a received  
3 encapsulating packet's source address and a source address of an inner packet within said  
4 encapsulating packet.

1           23. The invention as defined in claim 15 further comprising:  
2 an encapsulator that embeds each of said received inner packets as a payload in at  
3 least one encapsulating packet and places the address of said at least one port within the  
4 source address field of said at least one encapsulating packet.

1           24. The invention as defined in claim 23 wherein said encapsulator further places  
2 within the destination address field of said at least one encapsulating packet an address of  
3 said metropolitan area Ethernet network that is associated within said memory with a  
4 destination address of said inner packet.

1           25. The invention as defined in claim 23 wherein said encapsulator further places  
2 within the destination address field of said at least one encapsulating packet an indication  
3 that said encapsulating packet is a multicast packet when there is no address of said  
4 metropolitan area Ethernet network associated within said memory with a destination  
5 address of said inner packet.

1           26. The invention as defined in claim 23 wherein said encapsulator further places  
2 within the destination address field of said at least one encapsulating packet an indication  
3 that said encapsulating packet is a broadcast packet when there is no address of said  
4 metropolitan area Ethernet network associated within said memory with a destination  
5 address of said inner packet.

1           27. The invention as defined in claim 23 further comprising:  
2 a virtual local area network (VLAN) tag marker; and  
3 wherein said encapsulator further places within the destination address field of  
4 said at least one encapsulating packet an indication that said encapsulating packet is a  
5 broadcast packet when there is no address of said metropolitan area Ethernet network  
6 associated within said memory with a destination address of said inner packet, and said  
7 VLAN tag marker marks said encapsulating packet with a VLAN tag corresponding to an  
8 entity associated with said port at which said inner packet was received.

1           28. Program code in computer readable form for use in processing Ethernet  
2 packets, said computer readable program code comprising:  
3 a module for encapsulating contents of a first packet received at a port of a  
4 metropolitan area Ethernet network in at least one encapsulating Ethernet packet that is to  
5 traverse said metropolitan area Ethernet network; and  
6 a module for assigning the source address of said at least one encapsulating  
7 Ethernet packet to be the address of said port at which said packet was received.

1           29. Apparatus for use in providing metropolitan area Ethernet service,  
2 comprising:

3           means for encapsulating contents of a first packet received at a port of a  
4 metropolitan area Ethernet network in at least one encapsulating Ethernet packet that is to  
5 traverse said metropolitan area Ethernet network; and

6           means for assigning the source address of said at least one encapsulating Ethernet  
7 packet to be the address of said port at which said packet was received.

1           30. A metropolitan area Ethernet network, said metropolitan area Ethernet  
2 network comprising:

3           a plurality of edge switches, each of said edge switches being coupled to at least  
4 one of a plurality of local area networks (LANs) at ports of said edge switches, wherein,  
5 said edge switches encapsulate contents of inner packets received from said LANs into at  
6 least one encapsulating Ethernet packet, said encapsulating Ethernet packet employing as  
7 a source address an address of a one of said ports of said edge switch at which its  
8 encapsulated inner packet was received; and

9           at least one core switch for switching said encapsulating packets;

10          wherein each of said plurality of edge switches is coupled to said at least one of  
11 said core switches.

1           31. A method for use in packet communication, comprising the steps of:

2           dividing a first Ethernet packet having a source address and a destination address  
3 that is received at a port of a metropolitan area Ethernet network into first and second  
4 parts, said first and second parts being taken from portions of said first Ethernet packet  
5 exclusive of said source address and said destination address;

6           encapsulating said first and second parts in at least two respective encapsulating  
7 Ethernet packets that are to traverse said metropolitan area Ethernet network;

8           assigning the source address of each of said encapsulating Ethernet packets to be  
9 the address of said port at which said first packet was received;

10          assigning the source address of said first Ethernet packet as an inner source  
11 address of each of said encapsulating packets; and

12          assigning the destination address of said first Ethernet packet as an inner  
13 destination address of each of said encapsulating packets.

1           32. The invention as defined in claim 31 wherein first and second parts taken  
2 from portions of said first packet are divided at a point that is a function of a random  
3 number generator with a prescribed distribution.

1           33. A method for use in packet communication, comprising the steps of:  
2           receiving at least first and second encapsulating packets at an edge switch of a  
3 metropolitan area Ethernet network, each of said encapsulating packets containing a  
4 portion of data and/or cyclic redundancy check of a first inner packet that was fragmented  
5 into at least first and second encapsulating packets for transport via said metropolitan area  
6 Ethernet network; and  
7           reassembling said first inner packet using said portions of data and/or cyclic  
8 redundancy check contained within said first and second encapsulating packets.

1           34. The invention as defined in claim 33 wherein said first inner packet contained  
2 a source address and a destination address and each of said encapsulating packet further  
3 contains said source address and said destination address of said first inner packet.

1           35. A method for use in packet communication comprising the steps of:  
2           encapsulating a first portion of an inner Ethernet packet received at a port of a  
3 metropolitan area Ethernet network into a first encapsulating Ethernet packet;  
4           encapsulating a second portion of said inner Ethernet packet into a second  
5 encapsulating Ethernet packet when said first encapsulating Ethernet packet would  
6 exceed a prescribed Ethernet maximum packet length if said first portion was the entirety  
7 of said inner Ethernet packet; and  
8           assigning the source address of said first encapsulating Ethernet packet to be the  
9 address of said port at which said packet was received.

1           36. The invention as defined in claim 35 further comprising the step of assigning  
2 the source address of said second encapsulating Ethernet packet to be the address of said  
3 port at which said packet was received when said first encapsulating Ethernet packet  
4 would exceed said prescribed Ethernet maximum packet length if said first portion was  
5 the entirety of said inner Ethernet packet.

37. The invention as defined in claim 36 further comprising the steps of:  
 assigning a first sequence number to said first encapsulating Ethernet packet; and  
 assigning a second sequence number different from said first sequence number to  
 said first encapsulating Ethernet packet.

38. The invention as defined in claim 36 wherein the length of said first portion  
and the length of said portion is selected is selected so that said first and second  
encapsulating packets conform to a prescribed distribution for lengths of encapsulating  
packets.

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